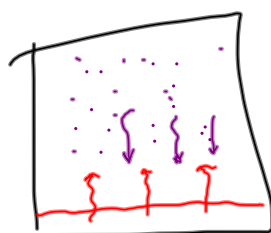


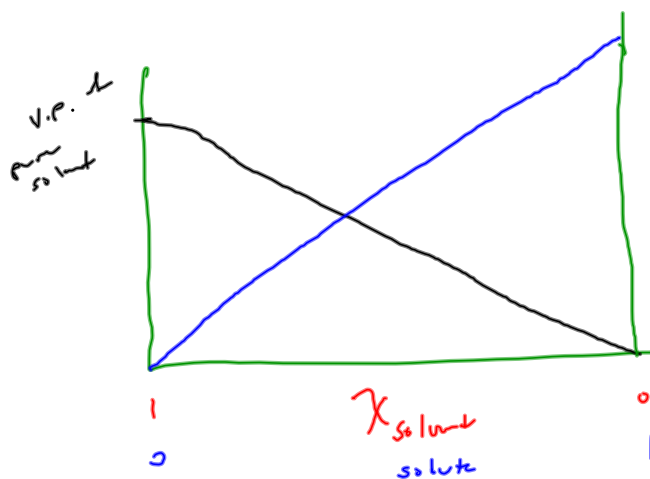
Quiz topics:

- solvation
- concentration units
- colligative properties (theory and math)
 - decrease in vapor pressure
 - boiling point elevation
 - freezing point depression
 - osmotic pressure

VP



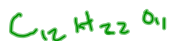
$P \downarrow$
 $P \uparrow$
 $>$ rates =



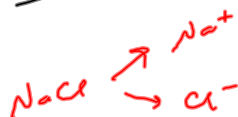
van't Hoff (i)

non-ionic

i = 1



ionic



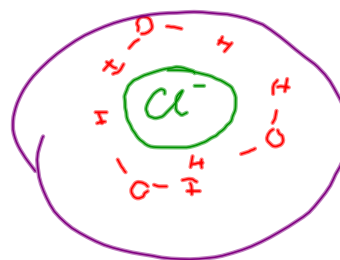
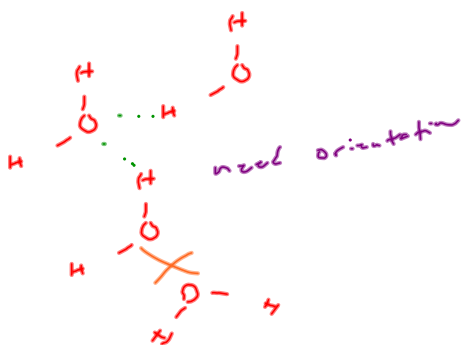
i = 2



i = 3



i = 7



$\text{H}_2\text{O} - \text{H}_2\text{O}$
orientation
is wrong
for ice

to freeze ... pull H_2O away
from solute
($\text{H}_2\text{O} - \text{H}_2\text{O}$ attr)

to make more effect
↑ ↓ (SSE)

$$m = \frac{\text{mol solute}}{\text{kg solvent}}$$

$\leftarrow \frac{g \text{ camphor}}{mm}$
 \uparrow
 $\text{mol} \times \frac{1 \text{ mol}}{1000 \text{ g}}$

2.5g (?)

50g H₂O

-0.147°C

$$\Delta T = k_f m i$$

\uparrow (from -0.147°C)
 \downarrow (to $m = \frac{\text{mols}}{\text{kg H}_2\text{O}}$)
 \rightarrow (to $\text{mols} = \frac{g}{mm}$)
 $\text{mols} = \frac{g}{mm}$

$m = \frac{\text{mols}}{\text{kg H}_2\text{O}}$
 .050 kg



$$P = \chi P^{\circ}$$

↗ v.p. solution
↖ v.p. of pure stuff
↖ mols solvent

↖ total mols
↖ solvent + solute

Phase changes

$$q = m\Delta H_{\text{vap}}$$

liq \leftrightarrow gas

or

$$q = m\Delta H_{\text{fus}}$$

liq \leftrightarrow solid

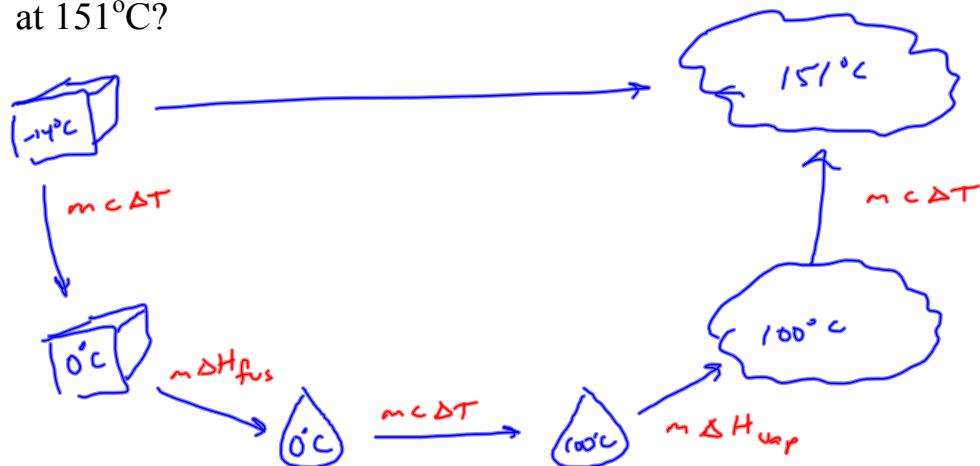
ΔH

$\frac{\text{cal}}{\text{g}}$ or $\frac{\text{cal}}{\text{mol}}$

$\frac{\text{J}}{\text{g}}$ or $\frac{\text{J}}{\text{mol}}$

$$1 \text{ cal} = 4.184 \text{ J}$$

How much heat is required to heat 13.7g of ice from -14°C until it is steam at 151°C ?



Heat capacity

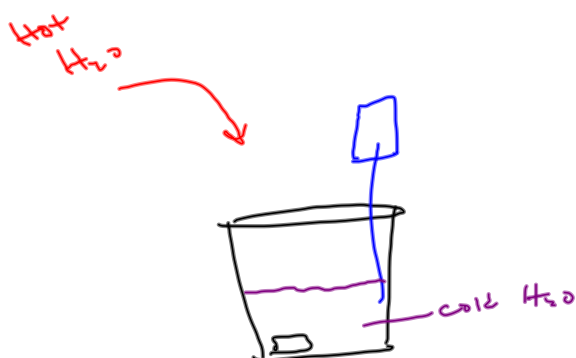


$$q_{rxn} = mc\Delta T_{H_2O} + mc\Delta T_{SR} + mc\Delta T_{TP} + mc\Delta T_{cup}$$

const = heat capacity = S

$$= mc\Delta T_{H_2O} + \Delta T (mc_{SR} + mc_{TP} + mc_{cup})$$

$$q_{rxn} = mc\Delta T_w + S\Delta T$$



$$(-) q_{hot} = q_{cold} + q_{calorimeter}$$

$$(-) mc\Delta T_{hot} = mc\Delta T_{cold} + S\Delta T$$